

CLAIMS

1. Microcellular fibers, characterized in that microcells are formed with a density of more than 10^7 cells/cm³ with a supercritical fluid introduced into fiber forming polymers and have a rate of volume expansion of 1.2 to 50, a ratio of microcell length to microcell diameter of more than 2 and a monofilament diameter of more than 5 μ m.
2. The microcellular fibers of claim 1, wherein the supercritical fluid is one of carbon dioxide (CO₂) or nitrogen (N₂).
3. The microcellular fibers of claim 1, wherein the fiber forming polymers include polyamide resins, polyester resins, branched polyester resins or polypropylene resins.
4. The microcellular fibers of claim 1 or 3, wherein the fiber forming polymers are polyamide 6 having a relative viscosity of more than 3.0.
5. The microcellular fibers of claim 1 or 3, wherein the fiber forming polymers are polyethylene terephthalate having an inherent viscosity of more than 0.8.

6. The microcellular fibers of claim 1 or 3, wherein the fiber forming polymers are branched polyamide 6.

7. A method for making microcellular fibers is characterized in that a supercritical fluid is introduced into an extruder upon melting and mixing fiber forming polymers in the extruder, to thus prepare a single-phase solution of molten polymer and gas, then the single-phase solution of molten polymer and gas is extruded (spun) through spinneret of spinning pack by subjecting the single-phase solution to a rapid pressure drop, to thus make microcellular extrusion materials, then the microcellular extrusion materials are rapidly cooled by a cooling medium, and then they are wound at a winding speed of 10 to 6,000m/min so that a spinning draft can be 2 to 300.

8. The method of claim 7, wherein the number of the spinneret perforated on the spinning pack is more than 2.

9. The method of claim 7, wherein the microcell densities of the microcellular extrusion materials are more than 10^7 cells/cm³.

10. The method of claim 7, wherein the winding speed is 50 to 6,000m/min.

11. The method of claim 7, wherein the supercritical fluid is one of carbon dioxide or nitrogen.

12. The method of claim 7, wherein the cooling medium is one of
5 a cooling air or water.

13. The method of claim 7, wherein water is sprayed to the microcellular extrusion materials to rapidly cool them.

10 14. The method of claim 7, wherein the microcellular extrusion materials are immersed in the water to rapidly cool them.

15 15. The method of claim 7, wherein the fiber forming polymers is one of polyolefin resins, polyester resins or polyamide resins.